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Highway Location as a Factor in Regional Development in Areas Adjacent to National Parks: A Case Study of the Great Smoky Mountains National Park Region

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To the Graduate Council:

I am submitting herewith a thesis written by Carl Rowan Leathers entitled "Highway Location as a Factor in Regional Development in Areas Adjacent to National Parks: A Case Study of the Great Smoky Mountains National Park Region." I have examined the final electronic copy of this thesis for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Master of Science, with a major in Architecture.

Aelred J. Gray, Major Professor

We have read this thesis and recommend its acceptance:

Walter L. Shouse

Accepted for the Council:
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Vice Provost and Dean of the Graduate School

(Original signatures are on file with official student records.)

May 17, 1967

To the Graduate Council:

I am submitting herewith a thesis written by Carl Rowan Leathers entitled "Highway Location as a Factor in Regional Development in Areas Adjacent to National Parks: A Case Study of the Great Smoky Mountains National Park Region." I recommend that it be accepted for nine quarter hours of credit in partial fulfillment of the requirements for the degree of Master of Science in Planning.

Alfred J. Gray
Major Professor

We have read this thesis and
recommend its acceptance:

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Vice President for
Graduate Studies and Research

HIGHWAY LOCATION AS A FACTOR IN REGIONAL DEVELOPMENT IN AREAS ADJACENT TO NATIONAL PARKS: A CASE STUDY OF THE GREAT SMOKY MOUNTAINS NATIONAL PARK REGION

A Thesis

Presented to

the Graduate Council of

The University of Tennessee

In Partial Fulfillment

of the Requirements for the Degree

Master of Science in Planning

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by

Carl Rowan Leathers

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ABSTRACT

How may highways be located in regions containing a national park so as to maximize the park as a resource appropriate to the stimulation of regional development and, at the same time, preserve the values which the park represents?

Research was conducted on the history and purposes of the national park system to determine factors which are relevant to the establishment of national parks and related areas. Available literature on the history and establishment of the Great Smoky Mountains National Park was used to supplement material obtained from personal interviews with various staff members of the park. The 1964 Master Plan for the park was studied to determine a clearer picture of development policy for the park.

The history of the development of highways and the present, emerging, and future highway system of the region were considered. Interviews with park administrators were conducted and the results coordinated with data compiled from traffic surveys by the National Park Service, the Bureau of Public Roads, and the highway departments of Tennessee and North Carolina.

Economic and population data from the Bureau of Census reports and other sources were employed to present a cursory development picture of the region.

Interior park planning should be related to, but not controlled by exterior forces and interests. The key element in the sound development of the region is a highway system designed to serve the park and the region, and planned to preserve their scenic qualities as a whole.

Because National Park Service policy requires major accomodations to be outside the park, the highway system must provide and encourage opportunities for commercial development within the region.

Because of the many interests involved in locating new highways there is a need for some machinery to consider conflicts of interest and to prepare courses of action. It is recommended that a regional council be established composed of representatives from the appropriate federal, state, and local agencies and departments, which would serve to resolve these conflicts and coordinate highway planning for the region.

A functional classification system for highways within the region is proposed.

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CHAPTER I

INTRODUCTION

The national park system is one of the important innovations in land use policy conceived and developed by the United States. It was the first major nation to establish a system of national parks as a means of preserving significant examples of its natural and cultural heritage for present and future generations.[1] The idea has been adopted by several other nations, notably Great Britain, Canada, New Zealand, the Soviet Union, and Japan, where similar park systems have been established.

The United States has, at the present time, an extensive National Park System comprising 231 areas covering approximately 27 million acres.[2] In addition to national parks, this system includes several other types of areas such as national historical parks, national monuments, national military parks, national cemeteries, national memorials, and national recreation areas, all of which are administered by the National Park Service. Most sessions of Congress have new bills presented which would expand this system of national parks and related

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[1]John Ise, Our National Park Policy (Baltimore: John Hopkins Press, 1961), p. 1.

[2]Stewart L. Udall, The National Parks of America (New York: G. P. Putnam's Sons, 1966), p. 11.

areas. An example is a bill now being considered by the 90th Congress which would create a Redwoods National Park in California, consisting of an area somewhere between 45,000 and 90,000 acres. This addition would raise the total number of parks in the system to thirty-two.

I. STATEMENT OF THE PROBLEM

A perusal of the planning literature prepared for regions adjacent to national parks indicates that very little regional planning appears to have been done which considered a national park as a resource. Any planning which is undertaken for a region that is within the influence of a national park or other unit of the system should take into account the existing and potential impact that the park has on the development of the region and, conversely, that the development of the region has on the park. This thesis is based on the premise that a key to the interaction between such a resource and the region is the highway system, and the pattern of access between the two which the transportation system allows.

The problem then is one of locating highways within the region around and through a national park so as to maximize the park as a resource appropriate to the stimulation of regional development and, at the same time, preserve the values which the park represents.

In order to construct a framework for finding appropriate solutions to this problem, it will be useful to identify the factors and interests which should be considered in locating highways within the region.

II. LIMITATIONS AND SCOPE OF THE THESIS

The thesis will be concerned primarily with identifying the factors and interests which should be considered in determining the location of new highways or upgrading existing highways within the region composed of the Great Smoky Mountains National Park and the eight counties bordering the park in Tennessee and North Carolina.

Although the principles evolving from this study may be applicable to the solution of planning problems in regions surrounding or adjacent to other National Parks, they have not been considered for application outside the study area.

CHAPTER II

THE DEVELOPMENT OF THE NATIONAL PARK SYSTEM IN THE UNITED STATES

The first recorded proposal advocating a national park probably originated in a series of letters written by George Catlin, an explorer and artist, and published in the New York Daily Commercial Advertiser in 1833.[3] These letters antedate by nearly forty years the establishment by Congress of Yellowstone National Park, the first national park of the system, in 1872.[4]

A study of the national park system will show that the early parks were not created without opposition. Strong private interests felt entitled to certain concessions and use of the parks. Many states also opposed the establishment of national parks and believed that, as state parks, rather than national parks, these areas could be a valuable source of state revenue. It was not until the states realized that the parks were not self-supporting that they ceased attempting to gain control of them and joined in support of a national park program, to be directed and controlled by the federal government.

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[3]C. Frank Brockman, Recreational Use of Wild Lands (New York: McGraw Hill Book Company, Inc., 1959), p. 53.

[4]Ibid., p. 57.

The early park administrators faced entirely different problems than do their present-day successors. The idea of national parks was new, and it was to be many years before park, state, and national interests in these parks were to be clearly related and defined. Many parks were located in isolated areas, and access was possible only by long and arduous travel. The fact that roads were almost non-existent, and travel slow and seasonal, discouraged most potential park visitors. Pressures by private interests were constant, and one marvels that the parks were not mutilated or even abolished during the early days of the program.

But the parks did survive, and public acceptance and support grew. Through the efforts of men like John Muir, President Theodore Roosevelt, and Gifford Pinchot and Stephen T. Mather, the number of national parks increased.[5] Congress was gradually able to enact laws which brought under control those private interests which were intent on seizing or monopolizing various park resources.

In addition, there were problems of administering the infant system. Prior to establishment of the National Park Service, America's collection of parks and monuments was loosely administered by several diverse agencies of the federal government.[6] National parks were administered by the Secretary of the Interior, but patrolled by soldiers detailed by the Secretary of War. With the establishment of the

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[5]Udall, op. cit., p. 10.

[6]Ibid.

National Park Service in the Department of the Interior, a series of dedicated Secretaries of the Interior and park administrators gradually built a competent organization to develop and manage the parks.

The National Park Service is responsible for the administration of the national parks and related areas as authorized by the act which established the National Park Service. It stated that:

> The service thus established shall promote and regulate the the use of the Federal areas known as national parks, monuments, and reservations hereinafter specified by such means and measures as conform to the fundamental purpose of said parks, monuments, and reservations, which purpose is to conserve the scenery and the natural and historic objects and the wild life herein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations.[7]

All areas of the National Park System, whether parks, monuments, or historic sites, are administered in accordance with the same basic principles as stated in the National Park Act of 1916. Due to the differences in their legal status, however, there are some differences in the management policies of these various categories. National parks can be established, enlarged, or reduced only by a specific act of Congress, while national monuments may be established by presidential proclamation, though only Congress can abolish them. National military parks and related areas are also administered by the National Park Service as are national historic sites.[8]

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[7]Brockman, op. cit., p. 110.

[8]Ibid., pp. 111-113.

The policy of the National Park Service was first defined on May 13, 1918, in a letter from Secretary of the Interior Franklin Lane to Director Stephen T. Mather, in which the following broad principles of national park management were listed:

> First, that the national parks must be maintained in absolutely unimpaired form for the use of future generations as well as those of our time; second, that they are set apart for the use, observation, health, and pleasure of the people; and third, that the national interest must dictate all decisions affecting public or private enterprise in the parks.[9]

An official statement of national park policy was also prepared by Louis C. Crampton, special attorney for the Secretary of the Interior, and was adopted in 1932 as the administrative formula upon which all later actions have been based. Included in this report was the policy declaration that a national park's maintenance should not depend upon the financial capacity of the State within which it is located, or upon its nearness to or remoteness from population centers, but upon its own outstanding, scenic, scientific, or historical quality and the national interest in its preservation. The report also contained the following principles which relate to the purposes of the parks and to the development of aread adjacent to the parks:

> The twin purposes of the establishment of such an area as a national park are its enjoyment and use by the present generation, with its preservation unspoiled for the future; to conserve the scenery, the natural and historic objects and the wildlife therein, by such means as will insure that their present use leave them unimpaired. . . .

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[9] Ibid., p. 130.

> Such administration must deal with important problems in forestry, road building and wildlife conservation which it must approach from the angles peculiar to its own responsibilities. . . .
>
> Roads, buildings, and other structures necessary for park administration and for public use and comfort should intrude upon the landscape or conflict with it only to the absolute minimum.
>
> The national interest should be held supreme in the national park areas and encroachments conflicting therewith for local or individual benefit should not be permitted.
>
> National parks, established for the permanent preservation of areas and objects of national interest, are intended to exist forever.[10]

A detailed study of this report points to the difficulty of setting down rules and regulations of such complete clarity that they can cover varied specific situations which occur in different sections of the country. Over the years, however, the National Park Service has developed some fairly consistent criteria relating to park administration, conservation, and use. The present policy relating to highway development seems to be one of extreme caution, and the guiding principle may be said to be that of "protecting the integrity of the parks." Resisting the demands by motorists for more scenic and varied highways has not been easy. The popular use of trailers, campers, and tents has precipitated considerable agitation for camping sites, access roads, and related commercial activity in and near our national parks. In a good many cases, these demands indicate a lack of understanding that the national interest precedes the local interest in park development.

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[10] Ibid., pp. 130-132.

To provide insight into the park policy of the National Park Service in general and also the problems that they face, it is appropriate to consider the national park situation as we observe it today. Practically all of the parks in the continental United States are greatly overcrowded during the tourist season. Yosemite National Park has been called a rural slum. In Yellowstone National Park there is over one square mile of parking space around Old Faithful Geyser, and the Great Smoky Mountain National Park expects over 7,000,000 visitors in 1968. The question is, "How can the parks be managed for the pleasure of the people without destruction of the values which give them pleasure?" Stated another way, the problem is, "How to preserve the natural features of the parks, yet make them available for the pleasure of the people?"[11]

Obviously, the parks are faced with a spiraling increase in attendance that makes one wonder what may be done. To attempt greater development and increased visitor use in some areas would be immensely destructive of the very values which make the area unique. Stewart L. Udall has put it this way:

> The Park Service, despite its name, is not a servant of the people in this direct and impossible sense--though we would be poor hosts indeed if we did not seek to make our visitors happy and pleased with their park experiences. Even though we are talking about public areas, I am convinced that it is not the responsibility of the administrators of such areas to comply with every use for which there is some public demand.

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[11]Udall, op. cit., pp. 10-11.

> Because some segments of the public clamor for extensive road systems in parks and wilderness areas is not sufficient justification for uninhibited development. The consequences of yielding to these pressures would lead to a lower standard of quality in these natural areas.
>
> Because some people cannot walk or climb, or will not do so, does not justify building a road to every scenic overlook.
>
> Because some people want to ride motorcycles, mechanized carts and jeeps on foot paths and horse trails is no reason to allow them to do so on every trail.
>
> Because some people like to see wilderness from the veranda of a modern hotel is not sufficient justification for building hotels within national parks when their location outside a park would provide necessary accomodations without encroaching on the natural scene.[12]

In 1962, at the request of Secretary of the Interior, Stewart L. Udall, the President of the National Academy of Sciences appointed an Advisory Committee to the National Park Service on Research and instructed it to prepare and submit to the Secretary of the Interior a report on the natural history research needs and opportunities in the national park system. Since the national parks are complex natural systems which, for their management, development, use, protection, and interpretation, require a broad ecological understanding, members of the park service and many scientists believe that a continuous research program is necessary if the nature of normal and manmade forces affecting the parks are to be understood, and if the parks are to be preserved

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[12] Ibid.

and remain a resource of increasing value to the people of this country.[13]

The results of this study, published in 1963, pointed out the critical need for an increased research program, adequately staffed and funded in order to learn how the parks might best be managed and preserved. It also pointed out that there are other factors than natural history which affect the natural features of the national parks, such as visitor use, access by road, and land use in surrounding areas.

The report further stated:

> Research should include specific attention to changes in land use, in other resource use, or in other economic activities on areas adjacent to national parks, and likely to affect the parks. The problems of operating a park to meet objectives given the National Park Service by legislation are closely related to events in areas surrounding each of the parks. Effective, economical administration of each park could be materially aided by timely research of a modest extent on resource use in such surrounding areas. This research could be carried on jointly with other agencies directly concerned.[14]

In June of 1966, the Tennessee Section of the American Institute of Planners prepared a "Statement on the Proposals for Designating Wilderness Areas Within the Great Smoky Mountains National Park," for consideration at the public hearings held in June by the National Park Service. This statement recommended that:

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[13] A Report by the Advisory Committee to the National Park Service on Research (Washington: National Academy of Sciences--National Research Council, 1963), p. 1.

[14] Ibid., pp. 70-71.

1. The National Park Service initiate immediate region-wide studies with the Forest Service, the Bureau of Public Roads, and the state planning and highway agencies of the states of Tennessee and North Carolina; that from these studies an effort be made to develop a regional plan for circulation in and through the region.
2. Such a study should also identify the public and private development opportunities in the areas surrounding the park.
3. That before final decisions are made on any highways or wilderness areas in the park the plan should outline in as great a detail as possible the anticipated use of the park under projected populations for the years 1980 and 2000, and that this use be distributed in such a manner as to recognize the role of the Great Smoky Mountains National Park and its relations to other recreational facilities in the region.

This thesis will attempt to lay a framework for the undertaking of a more detailed study to satisfy these conditions.

CHAPTER III

THE GREAT SMOKY MOUNTAINS NATIONAL PARK AND THE REGIONAL HIGHWAY SYSTEM

I. PHYSICAL FEATURES OF THE REGION

The topography of the region is dominated by various ranges of the Unaka Mountains, the southern portion of the Appalachian chain which extends from Maine to Georgia. The greater bulk of the Unakas lies within the boundaries of the Great Smoky Mountains National Park, which contains sixteen peaks exceeding 6,000 feet elevation. These mountains extend approximately seventy-one miles from east to west through the central portion of the park. Great vertical relief is prevalent in the park, ranging from 857 feet to a point in the extreme western portion to an elevation of 6,643 feet at Clingman's Dome, approximately twenty-seven miles due east, a difference of almost 5,800 feet.[15] Many ridges branch from the main crest of the range, and these ridges subdivide into many others which dissect the park into a complex series of drainage systems abounding with fast clear flowing mountain streams. The folded, fractured, and faulted rocks which make up the range are largely concealed by a soil mantle and the dense vegetation native to the humid

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[15]Michael Frome, Strangers In High Places (Garden City, New York: Doubleday, 1966), pp. 15-17.

climate.[16] Much of the terrain is very rough and broken, most slopes have very steep gradients, and cross country travel is difficult.

To the east and south of the park, in Western North Carolina, the Great Smoky Mountains are connected to the Blue Ridge Mountains by transverse or cross ranges. These, like the Smokies, are short but massive and average generally several hundred feet lower than the Smokies. The cross ranges are separated by valleys or river basins, while rising on their slopes are smaller creeks which carve the watershed into other small valleys. Between the subvalleys are ridges running off the main crests, with tributary coves opening into the subsidiary valleys. These transverse mountain ranges include the Balsams, the Newfound, Bald, Cowee, Nantahala, Valley River, and Snowbird Mountains.

Southwest of the national park, beyond Deals Gap, the mountains become the Unicois and are within the Cherokee National Forest, which makes up a large proportion of the eight county study region.

North of the Great Smokies in Tennessee, transverse ranges connect the park with Chilhowee and English Mountains. Beyond these, the Tennessee River has carved its great valley.

The drainage system is well defined. The area has been sculptured by rivers and streams for millions of years and have been a factor in shaping the area into its present pattern. East of the Balsams the waters drain eastwardly to the French Broad which flows north and west

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[16] Ibid.

to join the Holston above Knoxville, Tennessee, creating the Tennessee River.

South of the Tennessee-North Carolina state line and west of the Balsams, the Little Tennessee River, fed by the Tuckasegee and Nantahala Rivers, flows west through Deals Gap into Tennessee. Major streams on the Tennessee side of the mountains are the Little Pigeon and Little Rivers. Fontana Lake, highest lake east of the Mississippi River, borders the park in Swain County, North Carolina.

These are the predominant factors composing the landforms of the region. The structure of this region is complicated and not thoroughly understood even by geologists; the landscape has undergone endless change through countless ages. No section of this country possesses greater gifts of nature. Although much of the region has undergone intensive lumbering in past years, it has been spared the ravages of strip mining that has occurred in other parts of Appalachia.

Figure 1 shows the region with the major highway system. Figure 2 illustrates an example of the complex geology of the region.

II. ESTABLISHMENT AND HISTORY OF THE GREAT SMOKY MOUNTAINS NATIONAL PARK

The Great Smoky Mountains National Park, located in the heart of the Appalachian Mountains in western North Carolina and eastern Tennessee, was established on June 15, 1934. This culminated over eight years of effort on the project by both houses of Congress, the states of Tennessee

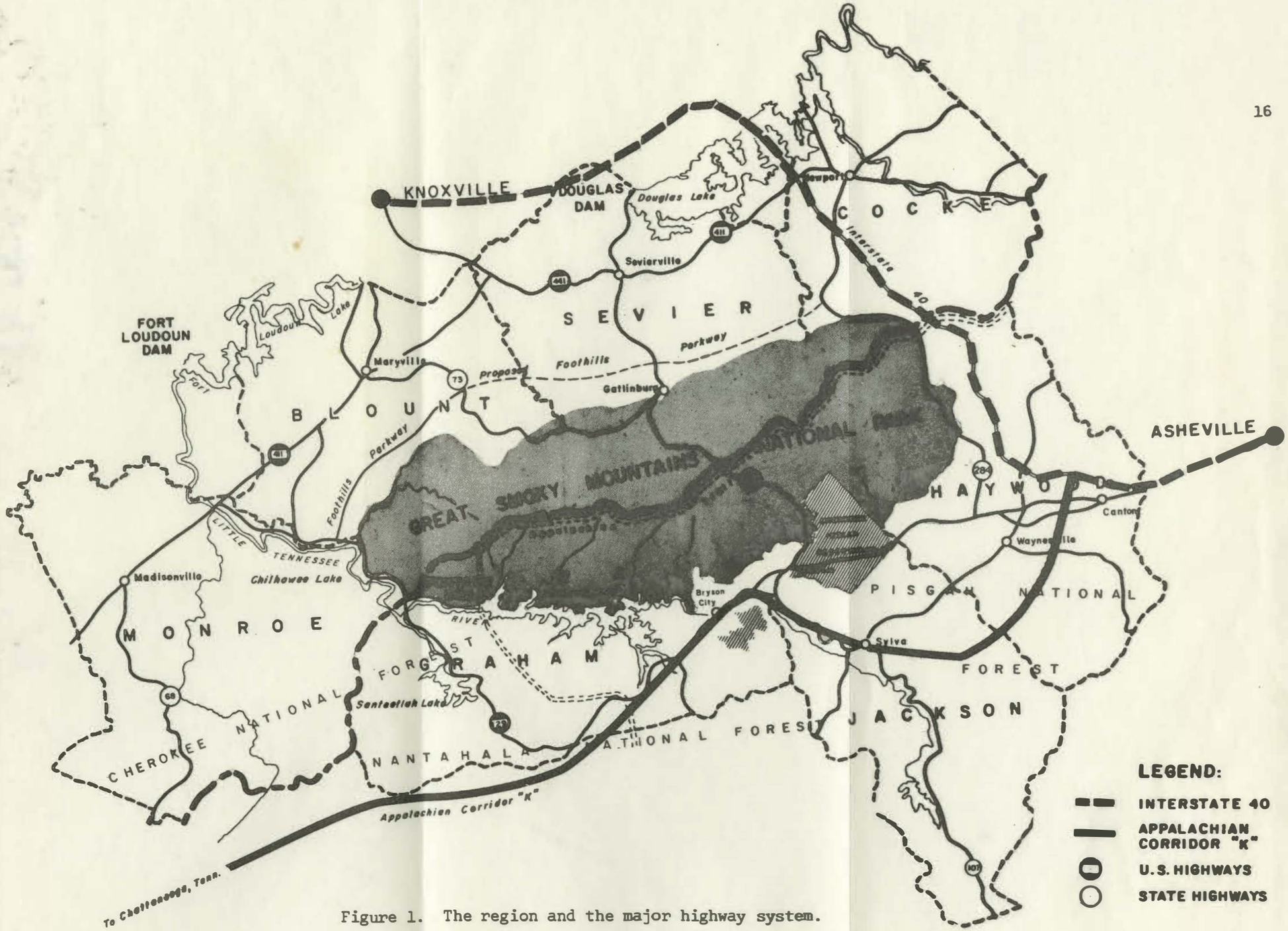

Figure 1. The region and the major highway system.

Figure 2. An example of the complex geology of the region.

The view is east toward Clingman's Dome as seen from Miry Ridge, in the Great Smoky Mountains National Park.

and North Carolina, and many interested citizens. Legal proceedings for the establishment of the park began on January 27, 1925, when Representative Temple of Pennsylvania introduced in the House a bill providing for the establishment of Great Smoky Mountains National Park. The bill provided for interim administration and protection of the area when 150,000 acres of the proposed park land were presented to the Government in fee simple. The bill passed both houses of Congress and was signed into law by President Coolidge on May 22, 1926.[17]

The States of Tennessee and North Carolina, early in 1927, passed legislation providing for the acquisition of lands which would also become a part of the proposed park. They also passed bond issues which were earmarked for the purchase of lands to be added to the park. Monies from private subscription and state appropriation were not enough to acquire adequate acreage. John D. Rockefeller, Jr., became interested in the project and through him a $5,000,000 contribution was obtained from the Laura Spelman Rockefeller Memorial Foundation. Upon receipt of this money, the Government began an extensive campaign to acquire land for the park.

By 1934, 400,000 acres of land had been obtained and the park was established. Land acquisition continued and 50,000 acres were added during the next six years. President Franklin D. Roosevelt formally dedicated the park on September 2, 1940.

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[17] Ibid., p. 185.

Since that time, additional lands have been acquired with Federal funds, the remainder of the Rockefeller donation, and by the transfer of approximately 44,000 acres to the park by the Tennessee Valley Authority. The park now consists of 512,673 acres, or approximately 800 square miles of superb mountain country.[18]

Purpose of the Park

The purpose of the park, as stated in the introduction to the 1964 master plan for the Great Smoky Mountains National Park, prepared by the planning team of the National Park Service is as follows:

> The Great Smoky Mountains National Park was established to provide a large National Park in the Eastern United States for the benefit and enjoyment of the people. To that end the legislative acts to transfer the land to the United States stipulates that administration, development, and protection shall be in accord with the 1916 establishment of the National Park Service. In accord with these acts, the park will perpetuate the natural resources of these magnificent mountains so that existing and future generations of mankind can continue to benefit from and enjoy the intangible values obtained by association with the forests, the landscape, the wild country, the mountain streams, and the wildlife for human experiences that are enjoyable, educational, healthful, and inspirational: and will preserve some vestiges of the mountain people's way of life--pioneer buildings, open fields, and vistas, artifacts and other momentos--for the lessons they teach of our vanishing past.[19]

This park is a permanent sanctuary for animal and bird life and a botanical garden and arboretum which, scientists claim, is unequaled

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[18]Udall, op. cit., p. 223.

[19]National Park Service, Master Plan for the Great Smoky Mountains National Park, 1964 (Washington: National Park Service), p. 3.

anywhere in the world.[20] It is the last remnant of the American Wilderness of any considerable size east of the Mississippi River, a great tract of virgin timber which will be allowed to stand in its natural grandeur safe from the usual forces of destruction.

The location of the park and the major highway approaches, from the eastern United States, are shown by Figure 3.

III. A HISTORY OF THE DEVELOPMENT OF HIGHWAYS WITHIN THE REGION

The early settlers in the Smoky Mountains region found only a few scattered Indian Trails. Many of these were gradually improved to allow the passage of mules, horses, and ox-carts. One of these trails, which crossed the Smokies at Indian Gap, was made into the first road over the mountains between 1831 and 1839.[21] Toll was charged but the main traffic consisted of livestock being driven from North Carolina to market in Sevierville. Later, another wagon road was extended through Franklin and Murphy, North Carolina crossing the traverse ranges to Ducktown, Tennessee. In 1849 a turnpike was completed along the Little Tennessee River from North Carolina into Tennessee. By 1859 there was a road from Asheville along the valley of the French Broad River through the gap in the mountains at Hot Springs.

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[20]Frome, op. cit., p. 338.

[21]Frome, op. cit., p. 79.

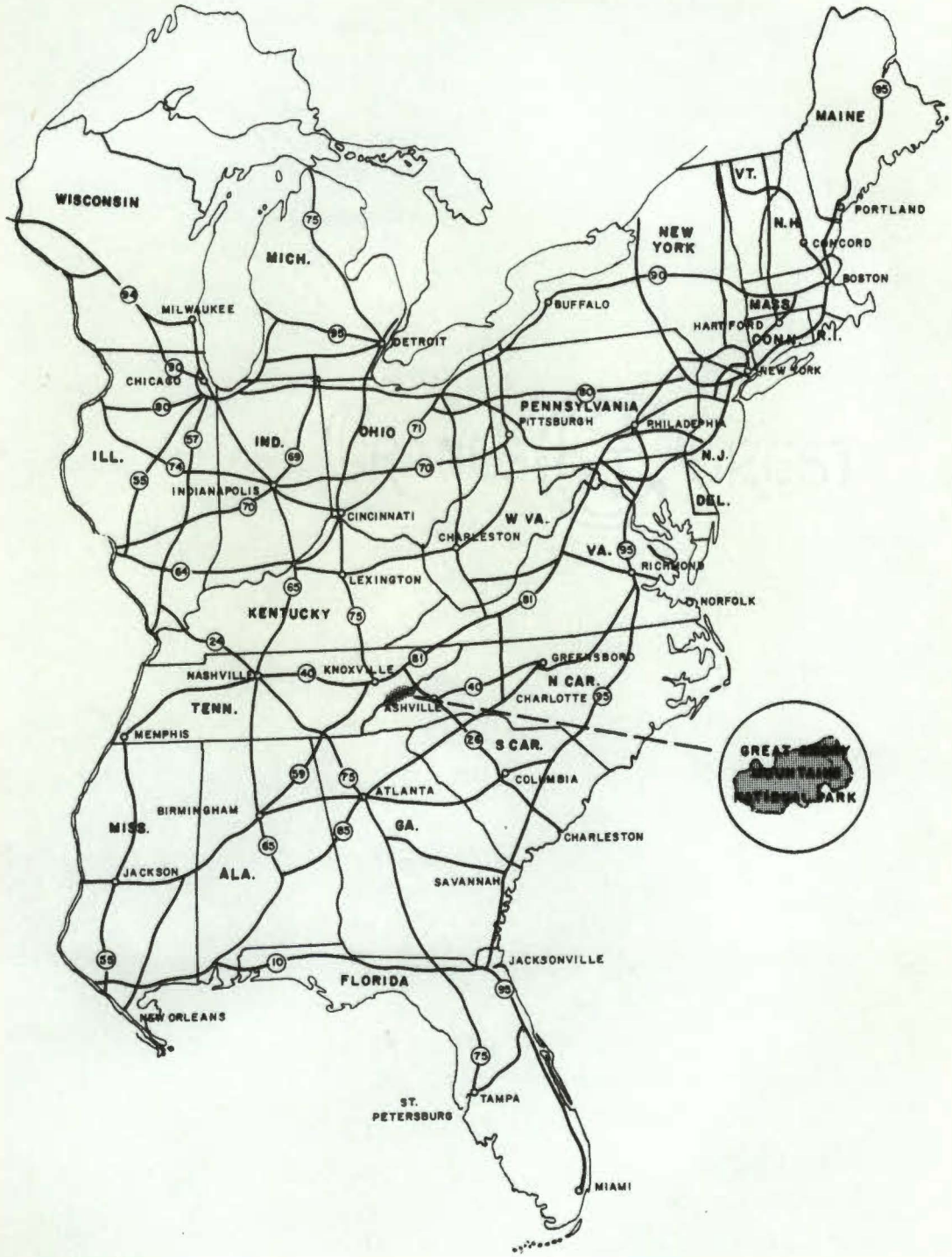

Figure 3. Location map of the Great Smoky Mountains National Park showing the major access routes from the Eastern United States.

From the 1860's and into the early 20th Century, railroad construction and lumbering became major factors in the economy of the region.

Highway improvements were precipitated by urban development and popular use of the automobile. The first major highway improvement within the national park began in 1931 with the construction of the transmountain road from Cherokee, North Carolina, to Gatlinburg, Tennessee, via Newfound Gap. A bituminous surface was completed in the early 1930's. This highway was later given federal status as U. S. route 441 to allow the park service to assume the responsibility for maintaining it within the park boundary.

Good highways are a fairly recent occurrence within the region and even today many sections are without adequate routes of transportation. Major access routes to the region include U. S. highway 25 from the north, and U. S. 411 and 11 from the southwest and northeast. From North Carolina U. S. highways 19, 129, 23, and the Blue Ridge Parkway serve the region.

The most heavily traveled access route to the park has long been U. S. route 441 which connects Knoxville and Gatlinburg, Tennessee, and Cherokee, North Carolina, across the mountains. Although originally designed as a connector and not a major highway comparable to U. S. 11 in the Great Valley of the Tennessee River or U. S. 411 to the east, recent improvements and traffic counts show that 441 carries a larger

volume of average daily traffic than either highway and is presently the most heavily traveled route connecting Tennessee with North Carolina.[22]

U. S. highway 129 and North Carolina highway 28, which border the national park on the southern boundary for approximately twenty miles, provide tourists with unexcelled views of the high peaks of the western Smokies and Fontana Lake. This highway follows part of the route of the old Little Tennessee River Toll Road. Highway 28 was constructed in conjunction with Fontana Dam and is much more negotiable than U. S. 129 which has many sharp curves.

The Blue Ridge Parkway, constructed primarily in the late thirties and early forties and only recently completed, was the first scenic parkway built in the United States. It connects the southern entrance of the national park with Asheville, North Carolina, and the populous states of the northeastern portion of the country. Traversing the ridge of the Blue Ridge Mountains for almost 400 of its nearly 500 miles length, the parkway veers from this course and crosses the Craggie Mountains near Asheville. From here it approaches the Smokies via the towering Balsam Mountains where the 6200-foot elevation makes it the highest motor highway in Eastern America. From the Balsams, the park is approached through historic Soco Gap and the Qualla Reservation, home of the surviving members of the Eastern Cherokee. The parkway is a limited access scenic

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[22]Traffic Flow Map, State of Tennessee. Tennessee State Highway Department, 1966.

highway and, although closed during the winter months, it is a major access route to the region from the northeastern states.

The Foothills Parkway, a more recently proposed addition to the nation's limited access scenic roads, will, when completed, stretch for approximately seventy miles from I-40 near Cosby, Tennessee, to U. S. 129 on Chilhowee Lake. Although twenty-eight miles are completed and paved, only seventeen and three-tenths miles, from Walland to Chilhowee Lake, are open to motorists at this time. The remaining paved portion of the parkway from Walland to Carr Creek in Blount County is scheduled to be opened in the Spring of 1968. The State of Tennessee has turned over the deeds to most of the right-of-way land, and construction awaits the appropriation of funds by Congress. When completed the parkway will be a factor in the development of tourist facilities on lands in proximity to interchanges with other routes.

Interstate Highways

The National System of Interstate and Defense Highways, usually referred to as the Interstate System, is a coast-to-coast network of limited access, high-speed, divided-median highways which connect with all major urban centers, serves the national defense, and connects with routes of continental importance in Canada and Mexico. When completed, the system will consit of approximately 41,000 miles of concrete-surfaced, all-weather thoroughfares which will enable motorists to drive from any city to any other city in the United States without encountering a single traffic signal while on the interstate system.

Interstate 40 skirts the northeastern end of the park area, and, when completed, will connect Knoxville and Asheville. It is inevitable that changes in regional traffic patterns, and land development in areas near the park and easily accessible from the interstate will rapidly occur when the system is open to traffic.

Tennessee state highway 73 borders the national park on the north and connects Maryville, Gatlinburg, and Interstate 40 near Cosby, Tennessee. Except for a few local roads used primarily by residents, there are no other major highways serving the region. The major inadequacies of the present highway system are manifest by serious traffic jams on U. S. 441 and the fact that other areas are difficult to reach because of narrow, rough, and circuitous roads.

CHAPTER IV

THE RELATIONSHIP OF THE PARK TO REGIONAL DEVELOPMENT

A study of the development of viable urban communities located in areas adjacent to national parks would probably indicate the presence of at least three prerequisites: (1) convenient highway access to major population centers, (2) developable land, and (3) convenient access to many of the park attractions. Although other factors might be listed, such as an active civic leadership, local amenities, or proximity to large metropolitan centers, these are probably of secondary importance. This would be true for Boulder, Colorado; Jackson, Wyoming; West Yellowstone, Montana; or Gatlinburg, Tennessee.

In recent years there has been a tremendous increase in population combined with increased per capita income and leisure time and a growing public interest in outdoor recreation. With over 81,000,000 automobiles registered in 1967, the United States has almost literally become a nation on wheels. For many years, between the end of World War II and 1967, touring by automobile ranked as the number one recreational pasttime of the American public. And although this is no longer true, according to the Bureau of Outdoor Recreation, tourism nevertheless remains a dominant factor in the economy of many regions.

In view of this situation, the question may be asked, "How does the development of highways and increased demand for better access to

outdoor recreation areas affect national parks, national forests, and private resort development in the surrounding region?" This section will point out some of these relationships as they apply to the economic base of the region, present and future land use patterns, and present, emerging, and future traffic patterns in the region as new highways are completed.

The Great Smoky Mountains National Park appears to have been the major force in stimulating the development of recreation facilities and other services and other phases of tourist oriented industries in Blount, Sevier, Haywood, and Swain Counties. Since there are no overnight facilities or services for motorists within the park (except for campers) the necessary development has taken place in those communities serving the greatest numbers of motorists. A continuation of the increasing attendance trends will have a significant impact on the tourist economy of these counties, as well as others which are receiving improved access by new highway construction. The primary effect of this changing land use pattern will be reflected in the development of motels, commercial facilities, and services in areas outside the park which will be constructed to accommodate the millions of yearly park visitors.

Although other factors, such as level land, convenient access, the availability of utilities, and proximity to a large population have influenced the location of commercial recreation facilities along the highways in the region, the mountain scenery and nearness to the park further enhance the values of lands which are appropriate for such development.

I. THE ECONOMIC BASE OF THE REGION

As defined in this thesis, the region includes the Great Smoky Mountains National Park and the surrounding counties in Eastern Tennessee and Western North Carolina. These include Monroe, Blount, Sevier, and Cocke counties in Tennessee, and Swain, Graham, Jackson, and Haywood counties in North Carolina. It should be emphasized that this region does not constitute a separate "economy" in any complete sense. The area has been defined as a planning region for the purpose of showing interrelationships between certain entities and resources, and in order to devise some logical guidelines for considering the future development of selected resources. It will therefore be appropriate to consider some of the present and anticipated economic activities in the region.

A consideration of the reciprocal interactions between a region's resources, economy and population ususally gives important insights into the possibilities for comprehensive planning in the region. Table I contains statistics for the region's population and economy.

Population

In 1950 the eight-county region had a total population of 199,269 persons. Between 1950 and 1960, the region gained 1,523 persons or an increase of only 0.07 per cent above the 1950 level.[23] This was far

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[23]United States Bureau of the Census, Seventeenth Census of the United States: 1950. Population, Vol. II (Washington: Government Printing Office, 1952), pp. 33, 42, 98 and 113; and United States Bureau of the Census, Eighteenth Census of the United States: 1960. Population, Vol. II (Washington: Government Printing Office, 1961), pp. 230 and 267.

TABLE I

GENERAL POPULATION AND EMPLOYMENT DATA FOR THE REGION FOR THE YEARS 1950, 1960, & 1966

	1950	1960	1965	Per Cent Change
Total Population	199,269	200,792	209,896	
Employment By Major Industry				
Manufacturing	17,703	21,241		+20.0
Construction	3,889	5,181		+33.2
Agriculture	17,350	8,265		-53.0
Wholesale Trade	607	926		+52.0
Retail Trade	7,318	9,264		+26.6
Finance, Insurance, and Real Estate	485	941		+94.0
Other Categories	12,810	17,077		
Total Employment	60,162	62,895	63,464	
Number Unemployed		4,034	4,000	
Unemployment Rate			5.9%	

Source: United States Bureau of Census, Seventeenth Census of the United States: 1950. Population, Vol. II (Washington: Government Printing Office, 1951), p. 98; Eighteenth Census of the United States: 1960. Population, Vol. II (Washington: Government Printing Office, 1961), p. 230; Estimates of the Population of North Carolina Counties as of July 1, 1965. Agricultural Experiment Station, North Carolina State University (Raleigh: March 1965); and Ormand C. Corry, Tennessee Population and Personal Income by Counties, 1960 to 1965. Tennessee Survey of Business. University of Tennessee, Vol. II, No. 8 (Knoxville: April, 1967).

below the 18.5 per cent gain for the United States and the 8 per cent gain for the states of Tennessee and North Carolina during the same period of time. Between 1960 and 1964 the regional population increased from 200,792 to 209,763 or 4.5 per cent.[24] This is a significant increase over the 1950-1960 decade and may indicate a more stable population structure within the region.

Employment

It is also interesting to note that total employment in the region also increased by 4.5 per cent during the decade between 1954 and 1963. The following is a cursory analysis of the changes in employment statistics and related material during this period.

Agriculture

The changes in the levels of the occupational structure of the work force reflect a fundamental relationship between the population and the local economy. It is obvious that employment in agriculture has declined steadily over the past decade and a half, while productive industries registered employment gains, especially manufacturing. Agricultural employment decreased from 17,350 in 1950 to 8,265 in 1960, a 53 per cent decline. The number of farms within the region has decreased while there has been an increase in farm acreage due to consolidation. This trend has been due to rugged topography which is

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[24]Ormand C. Corry, Tennessee Population and Personal Income by Counties, 1960 to 1965. Tennessee Survey of Business, Vol. II, No. 8 (Knoxville: University of Tennessee, April, 1967); and Estimates of the Population of North Carolina Counties as of July 1, 1965 (Raleigh: Agricultural Experiment Station, North Carolina State University, March, 1966).

unsuited to modern agricultural technology, and to the peculiarities of today's economy as it affects agriculture and farm ownership.

Manufacturing

The number and size of manufacturing firms for the past 14 years gives an indication of the industrial growth of the region as compared with other regions, states or with the entire nation. From 1954 to 1958 the increase in number was approximately 8 per cent, and from 1958 to 1963, 7.2 per cent. For Tennessee this figure was 16.3 per cent and for the United States 6.8 per cent. This number of manufacturing establishments with 20 or more employees also increased from 46 in 1954 to 57 in 1958, and to 70 in 1963. Of the 237 manufacturing firms in the region, slightly more than one-third employed 20 or more persons. Total manufacturing employment increased nearly 20 per cent, from 17,703 in 1950 to 21,241 in 1960.

Two explanations may be possible for the small increase in the number of manufacturing firms. Some firms have increased their size and output, and as a consequence the region requires fewer firms to employ the available work force. Secondly, Blount County reported 12 fewer firms in 1963 than in 1954, and 880 fewer industrial employees. This situation was precipitated primarily by Alcoa Aluminum's accelerated automation policy. Graham and Haywood counties also showed slight declines in manufacturing employment. These declines reduced the significance of increases in other counties of the region.

Value Added

The productivity of the region's industrial sector is also significant. The Census of Manufactures reported that value added within the region increased from $60,779,006 in 1954 to $95,302,000 in 1963, a gain of 56 per cent during the period. These statistics may not give a completely accurate picture due to disclosure problems of the Census for Blount and Graham counties.

Construction

Employment in the construction industry has increased considerably in recent years. One has only to notice the construction of new motels, automobile service stations, and various tourist-oriented facilities throughout the region to realize the great impact that tourism and recreation are having on the area.

Retail Activity or Other Activity

Retail activity has shown a larger increase than might be explained by the regional population and income growth. This is especially obvious in resort areas which have enjoyed a significant increase in tourism during the past two decades. The number of retail establishments increased from 1,857 in 1958 to 2,022 in 1963.

Wholesale Activity

Wholesale merchandising showed only a slight increase during this same period. It may be surmised that this type of activity would be more appropriate to the larger metropolitan transportation centers.

Finance, Insurance, and Real Estate

Real estate, insurance, and financial employment, while a very small segment of the total economy of the region, enjoyed a significant increase between 1950 and 1960.

Forest Products

The economic importance of forest products in the region should not be overlooked. In 1963 there were 86 lumber and wood products in the region. Ten of these employed from 20 to 249 persons. Approximately 68 per cent of all land in the region is in forest. Although separate figures are not available, the sales of lumber products is believed to have increased significantly during recent years. The forest service estimates that pulpwood production has nearly tripled between 1950 and 1961, due primarily to pine stocking and improved forestry practices throughout the area.

Resorts

There were 340 hotels, motels, and tourist courts in the region in 1963. This segment has increased greatly since that time and although employment figures for the region are not available, certain resort communities such as Gatlinburg and Cherokee are almost totally oriented toward a tourist supported economy.

National Park Employment

The national park also is a source of revenue for the region. In 1965, the Park employed 198 persons the year around and 280 persons during June, July, and August.[25] Its estimated 1965 payroll was

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[25]National Park Service, Great Smoky Mountains National Park Visitor Data, 1967. Gatlinburg: National Park Service. (Mimeographed.)

1,200,000 dollars. In addition, construction work is constantly being carried on. In 1967, 4,500,000 dollars in contracts were in operation and over 4,000,000 dollars have been allocated for fiscal 1968.

The Economy of Gatlinburg

Since the development of the national park, Gatlinburg has become the major gateway to the Smokies for visitors from Tennessee, Kentucky, Georgia, Alabama, and the eastern North Central states. Its economy has changed from a mountain village as a center of trade and lumbering in the 1920's to the largest resort in the region. In 1965, facilities for tourists included six hotels, 143 motels, 47 eating establishments, and 89 retail firms of which 56 were craft-gift shops. Gatlinburg's population increased 35.5 per cent from 1,700 in 1960 to 2,303 in 1965.[26] The city's estimated daily summer population is approximately 16,000.[27]

Of the 2,780,000 park visitors who entered the park at Gatlinburg in 1966, over one-third stayed in the city for an average of 2.05 days. While in the area, each person spent about 21 dollars per day.[28] This meant a contribution to the local economy of over 36,000,000 dollars during the year.

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[26]Gatlinburg Chamber of Commerce, Report on the Population and Economy of Gatlinburg, 1967 (Gatlinburg: W. M. Cline, 1968).

[27]Ibid.

[28]U. S. Bureau of Public Roads, Report on Great Smoky Mountains National Park Travel Study, 1957 (Washington: Government Printing Office, 1957), Tables 1, 6, 8, and 40.

Significant land use statistics show that less than one per cent of the total developed area of the town was devoted to manufacturing uses, 24 per cent was occupied by services, cultural-recreational uses, and retail trade, and residential uses accounted for 73 per cent. There appears to be no indication that the local economy will alter significantly from tourism which furnishes from 2,000 to 3,000 jobs, primarily during the summer months. Since the town is abutted by the park on one side and is surrounded by steep mountain slopes on other sides, its potential for expansion is severely restricted. The most probable direction for expansion is north along Highway 73 toward Pittman Center.

Other Urban Centers Within the Region

Several towns in the region, including Maryville-Alcoa, Newport, and Waynesville have developed without significant influence from the national park. These communities originated as trading centers for agricultural areas and have lately been influenced by manufacturing industries. In addition to Gatlinburg, the growth of Cherokee, Bryson City, Pigeon Forge, and Sylva has shown a close relationship to tourism and park visitation. These communities will probably continue to serve tourist needs and attract some small manufacturing industries.

Certain areas such as Cosby, Jonathan Creek, located at the east end of Maggie Valley, and Townsend will be significantly influenced by the future tourist traffic entering the region via Interstate 40 and the Foothills Parkway, and also by National Park Service developments in the vicinity.

II. PRESENT, EMERGING, AND FUTURE TRAFFIC PATTERNS

Although the region is connected with adjacent areas, the main gateways are considered to be below standard. There were and are large topographic problems, of course, and modern highways are difficult and expensive to build. There are still major bottlenecks today on some of the major highways in and out of the region. Existing two-lane roads cannot handle heavy loads of high-speed modern traffic. Industrial operations have been hindered by the costs and delays caused by the inadequate highway system.[29] There are traffic jams for short periods on weekend evenings during the summer months. It is probable that some of the motorists caught in these weekend traffic jams are not here primarily to see or use the park, but are merely availing themselves of the most convenient route between East Tennessee and Western North Carolina.

Crowded highways seem to be a ubiquitous situation, unforeseen by demographers or economists and are more the rule today rather than the exception. There is evidence that highway planning in the Smoky Mountains region has been primarily concerned with meeting immediate problems rather than in designing a system which would offer further development of the entire area. Highway planning cannot successfully be premised

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[29]Hammer and Company Associates, Economic Consultants, The Economy of Western North Carolina (Atlanta: Hammer and Company Associates, 1961), p. 81.

on a few short periods of congestion during the year. Since the months of June through August of 1956, when 70 per cent of the park traffic entered at Gatlinburg via Highway 441, there has been a noticeable shift in the traffic pattern.[30] By 1965 only 44 per cent of the park visitors arrived via the Gatlinburg entrance, and by 1966 this had fallen off by one more per cent.[31] Volumes on U. S. 441 have not declined; motorists have simply discovered the formerly less congested areas of the park. There is evidence which indicates that many of the local park users began to use the Townsend highway 73 entrance to the park during weekends and peak attendance months. This entrance also connects directly with Cades Cove, one of the most popular attractions in the park.

According to a survey conducted by the Bureau of Public Roads in 1965, 32 per cent of the park visitors were from Tennessee. Another 24.2 per cent of the visits originated in states located to the north and west of the park. This would indicate that better access is available to the park from these states because these states are not appreciably more populated than states in other directions.

Another factor which may contribute to this pattern is the relationship of these northern states to the park, the State of Florida

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[30]U. S. Bureau of Public Roads, Report on Great Smoky Mountains National Park Travel Study (Washington: Government Printing Office, 1957), p. 8.

[31]National Park Service, Smoky Mountains National Park Visitor Data, 1967 (Gatlinburg: National Park Service), Table XII. (Mimeographed.)

and other states bordering the Atlantic Ocean. A considerable number of people visit the park during a trip to Florida or the coastal areas. It is extremely significant that the park is easily accessible to a large percentage of these northern tourists.

The months of June, July, and August have accounted for slightly over 50 per cent of the total yearly visits during recent years. It is during these months, especially, followed by October, that occasional traffic jams result on Highway 441 and in Gatlinburg and Cherokee. U. S. 441 was still the most heavily traveled route in 1966 and 1967.

Traffic counts for 1967 show that an average of 6,879 cars per day entered the park during the month of June, 9,893 per eight-hour day during July, and 9,200 per day during August. On July 2, 1967, 13,885 cars entered the park. The total cars in the park for the months of June, July, and August 1967 was 798,249 cars. The total number of cars crossing the mountains between Gatlinburg and Cherokee in 1967 was 4,972,800.[32] Figure 4 shows average daily traffic for the region for the year 1966.

During the year there were 109 automobile accidents on U. S. 441 between Gatlinburg and Cherokee. There were, however, no fatalities. Since the speed limit on this highway is 45 miles per hour and over 75 per cent of these accidents involved only one automobile, traffic experts agree that the accident causes were due primarily to alcohol,

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[32] Ibid.

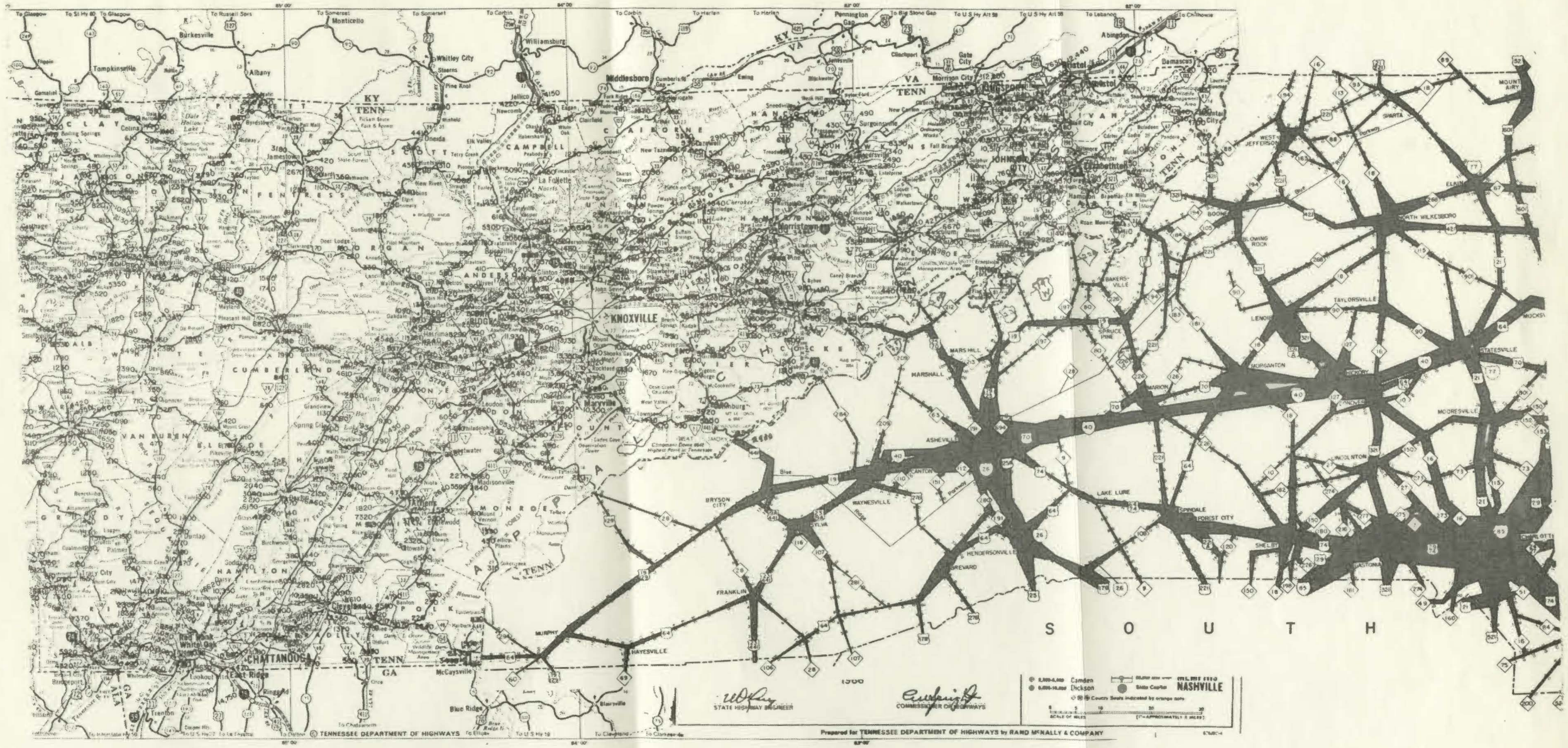

Figure 4. Average daily traffic flow map, 1966, Eastern Tennessee and Western North Carolina.

bad weather, and carelessness. This highway is one of the safest in the nation and few stretches of highway on the American continent can match its safety record.

Recognition of the occasional congestion has recently precipitated several major highway construction projects in and on areas adjacent to the park. In Gatlinburg, a scenic by-pass is under construction and will be open to traffic by June 15, 1968. This will serve to alleviate considerable traffic congestion in Gatlinburg and hasten ingress and egress from the park. It should also benefit commercial interests in Gatlinburg by separating park visitors from city visitors, thus allowing the former to pass more quickly to the park and giving the latter more room to maneuver in the commercial center. U. S. 441 is also being made into four lanes in Cherokee, North Carolina, which will also alleviate the occasional congestion here.

Burdened by heavy public demand for more roads in the park, the park service has endeavored to satisfy this demand by opening up many of the old "back-country" roads to improve automobile circulation. The Cades Cove 12-mile, one-way road was the first of these and remains the most popular of the loop roads. A five mile one-way loop road from Cherokee Orchard near Gatlinburg via Roaring-Fork Creek and other "motor nature trails," have been constructed so that citizens may see natural areas without walking. The one-way roads give the motorist a feeling of being the first person on the scene and are very popular. Another one-way road, approximately 15 miles in length, was opened in

1967, in the Heintoga-Round Bottom-Cherokee Indian Reservation area on the North Carolina side of the national park. There are several other "unimproved" roads throughout the park which afford the motorist a chance to see, as well as is possible from an automobile, the scenic values of the park. However, topographic condition and the absence of suitable locations for this type of road preclude any significant additions to this system in the future.

In recent years there has been considerable publicity on the need for more roads within the interior of the park. There are, as was previously mentioned, several "back country loop roads," appropriately located and affording the motorist excellent examples of pioneer architecture, panoramic views and other scenery. The park service has failed to publicize this fact and has given these roads the inappropriate name of "motor nature trails," which lead many motorists to believe that they must leave their cars and walk on these "trails." By simply calling these roads "scenic park roads," and advertising their existence, many people believe that public demand for more park roads could be largely satisfied.

To the north and wouth the counties bordering the park have, in many respects, an inadequate road system. To the south the counties of Swain, Graham, and Jackson, North Carolina, are relatively isolated from their own state and from the neighboring states of Tennessee, Georgia and South Carolina. Bounded by mountains on all sides, they are accessible only by highways along the river and streams that have

carved narrow valleys through the mountains and over low gaps in the ridges. The only low level access is along the southern boundary where U. S. highways 19 and 441 enter the region. Other entries are at elevations ranging from 3,315 to 5,050 feet.

Some highways in mountainous areas within the district are in somewhat poor repair due to rock slides, drainage problems, and freezing. Average daily traffic figures indicate few congestion problems and these highways offer the tourist a very pleasant and scenic drive during good weather. Although 21 miles of U. S. highway 129 has a number of curves, it offers some of the most spectacular scenery to be found in the region. This is also true of state highway 28 to Bryson City. Major bottlenecks will be alleviated with the construction of the Appalachian Corridors Highways through the area south and east of the national park and extending into East Tennessee near Chattanooga and into Georgia and its principal city of Atlanta. Both will parallel existing routes through valleys and gaps in the mountains. These routes will improve access into the region from the southwest and south.

To the north major improvements in the region's transportation system will be realized when Interstate highway 40, which cuts east-west through the region, is completed. This highway will also provide improved access from north and south through connections with Interstate highways 75 and 85. Interstate 40 will become the major thoroughfare connecting northern and eastern states with the North Carolina part of the region. It will replace U. S. highways 70 and 25 in this respect.

The improved accessibility of the region offered by the Interstate System will precipitate new investment in tourist-oriented facilities in various areas. One of the more appropriate centers for investment activity will be the Cosby, Tennessee, area. With convenient access from Interstate 40 and a nearby connection with the proposed Foothills Parkway and proximity to Gatlinburg and the national park, the demand for tourist accommodations will soon become evident. This increased traffic on Highway 73 will also probably decrease traffic on U. S. 441 from Knoxville to Gatlinburg, which is presently the major gateway to the park.

North Carolina highway 284 connecting Waynesboro, North Carolina, with Cosby, Tennessee, is located within the boundaries of the national park for approximately 12 miles. Average daily traffic for 1966 is approximately 400 vehicles. This road is unpaved at the present time and the park service has proposed that it be closed when Interstate 40 is completed. This does not appear to be a wise consideration in view of the total traffic circulation situation within the region. Only a slight upgrading, including paving, of this highway would be a valuable addition to the emerging pattern of traffic circulation around the periphery of the park. (See Figure 2, page 17.)

This is the traffic pattern that will probably emerge in the region and continue to become more apparent in the near future. In summary, the interstate system and the Appalachian highways will become the major connecting thoroughfares for the region. Some of the present

major highways will be superseded in importance by these thoroughfares. A peripheral traffic circulation pattern within the region and around the national park will develop with the completion of Interstate 40 and the Foothills Parkway.

CHAPTER V

FACTORS AND INTERESTS TO BE CONSIDERED IN REGIONAL HIGHWAY LOCATION

This chapter will be concerned with a general discussion of certain factors and interests which should be considered in the process of locating highways within the region. The most obvious and decisive factor has always been the topography. There have also been interest groups and political factors which have affected the location of these highways.

I. TOPOGRAPHY AND OTHER NATURAL FEATURES

The mountainous and rugged terrain of the region has been a dominant factor in the development of the region. It has a major influence on transportation, communication, urbanization, and regional development. This will be true in the future, although new highways and local roads will permit more extensive development within the region. For the greater part, land suitable for development by man is limited to the coves and stream basins between major mountain ranges. Here are located most of the highways and urban areas of the region.

Much of the land in the region is too steep for urban development, and many of the soils do not lend themselves favorably to farming under today's agricultural economics. Successful farming operations are

limited to stream valleys and coves. Many of these stream valleys are also in flood plains and are therefore unsuited to urban development. Commercial development will also be prohibited along the scenic parkway type roads and will be somewhat restricted along the interstate highway.

The recent highway construction on the Foothills Parkway and on Interstate 40 along the Pigeon River Gorge has caused drastic contour realignment with resulting unsightly scars, earth slides, and erosion. This destruction is visible for many miles in these mountains and defies attempts at stabilization for many years. The resulting erosion and siltation has disastrous effects on watersheds, polluting the mountain streams which otherwise are valuable sources of recreation. The water table of entire mountains are also often lowered or permanently damaged, with serious effects to the growth of trees. In addition the erosion has very negative effects on the scenery which should be one of the outstanding experiences of traveling within the region.

Due to inadequate knowledge of the geological formations along the proposed highway routes, and the standards imposed by the Bureau of Public Roads, modern construction causes frequent earth-slides. These slides often continue until the entire formation is removed, which is not only expensive but causes an extensive and unsightly scar on the landscape. Such slides have recently occurred on the 441 Parkway between Pigeon Forge and Gatlinburg and on the Foothills Parkway. In fact, the opening of the first section of the Foothills Parkway was delayed for one and one-half years because of earth-slides. More thorough geological information on proposed highway routes in mountainous

country or more realistic and appropriate standards by the Bureau of Public Roads might prevent such future examples of improper highway locations. More realistic alignment, sight distance, and grade standards would also be of great benefit in minimizing damage to the landscape by present highway construction methods.

Figures 5 through 7 are examples of the effects of present highway construction of the mountainous terrain of the region.

II. AESTHETIC CONSIDERATIONS

Another major factor in highway location is the scenic quality of the region. A primary principle of aesthetic relationships in this area is as discussed above that highways should be in harmony with the terrain and natural surroundings. The intrinsic visual quality of the highway as an independent structure is also important; that is, the quality of the visual experience created by the highways physical form, structure, and equipment--such as medians, bridges, guard-rails, signs, and light poles.[33] Then there is the problem of the roadside outside the highway right-of-way. Visual factors here, such as scale, contrast, harmony, color, and texture are vital to the total quality of the visual experience which the traveler perceives. The first two principles are the responsibility of the design engineers, while the latter depends

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[33] Report on a Preliminary Plan for Scenic Highways, Citizens Advisory Committee on Scenic Highways (Sacremento: California State Printing Office, 1962), p. 12.

Figure 5. An example of contour realignment resulting from present highway standards and construction methods in mountainous terrain, Part 1.

A section of Interstate 40 near Cosby, Tennessee, showing some of the effects of modern highway construction. Extreme contour realignment has resulted in unsightly highwalls and erosion. Although this section is still under construction, landscape architects have not been able to minimize or solve many of the problems which are caused by modern highway construction methods and standards.

Figure 6. An example of contour realignment resulting from present highway standards and construction methods in mountainous terrain, Part 2.

The view shows recent construction on Interstate 40 near Cosby, Tennessee. What happened to the scenic beauty of these southern mountains and the clear mountain stream?

Figure 7. An example of contour realignment resulting from present highway standards and construction methods in mountainous terrain, Part 3.

Landscape architects have attempted for approximately six years to stabilize the highwalls which resulted from this destructive treatment of the land. The road is located in the national park near Bryson City, North Carolina. Revised standards for highways in scenic areas would be indicated where present standards cause such undesirable results.

upon state and local officials and the sensitivities of private individuals. Failure by state governments to adopt appropriate regulations to protect roadside amenities leaves the public with no protection against the legal vandalism of scenic beauty by certain commercial interests. Failure of local governments to adopt appropriate ordinances to protect roadside aesthetics and highway access points invariably will negate the best efforts of the design engineer.

With the present day proliferation of highway-oriented services and billboards, the problem of keeping roadside scenery free from clutter so that it will be attractive to residents and tourists is another of the great challenges facing a variety of interest groups. Many highways in the region would be much more scenic and attractive if some controls were extended over development, access, and commercial art forms such as billboards. This would serve the purpose of increasing scenic highway mileage without the expense of new highway construction and maintenance. This has not, as yet, been done, and the result is that many scenic vistas have been adversely affected. The state and local governments and many individuals in Tennessee and North Carolina have benefited from the many visitors drawn to the national park but have refused to enhance the aesthetic values of the surrounding gateways to the park by adopting zoning and other standards to protect them. At the same time that scenic beauty is being reduced outside the park, many individuals are demanding that the Park Service build additional highways inside the park so that scenic beauty would not

"go to waste."[34] Others want highways for varying reasons to which we shall now turn.

III. INTERESTS INVOLVED IN HIGHWAY LOCATION

The interest groups which are concerned with highway development in and around national parks are not in accord as to the appropriate location, type, or purpose of these new highways. The position of each group varies according to its financial interest or philosophy.

Local Interests

Highways which connect large population centers with scenic resources and recreation areas are an external economy to land developers and certain commercial entrepreneurs. There is constant agitation from these groups, through political channels and local chambers of commerce, to have existing highways improved, and to have additional highways constructed where they will be most beneficial to the local interests. These interests are often opposed by other groups.

The Conservationists

The conservationists generally oppose the construction of highways in wilderness areas. The primary concern of the conservationists relates to the designation of certain lands as wilderness or undeveloped areas and also to how stringent should be the rules against roads, developments, and intensive use in these areas. They proclaim, with undeniable

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[34]Frome, op. cit., p. 311.

validity, that the pressure of increased visitation is greater than the ability of many areas to withstand without serious damage to the scenic and natural values which make certain areas, both public and private, so valuable as parks and recreation areas. There are many examples of great destruction to natural areas caused by man's interference with the ecological balance. The drainage canals' effect on the Everglades and the damage to the Sequoia groves in California by thousands of visitors are cases where this balance has been disturbed. The conservationists are seeking to prevent comparable ecological imbalances from occuring in the future.

The General Public

The general public may be represented by the more than 7,000,000 persons who visited this largest and most popular park in the Eastern United States in 1967. This large attendance is easily explained by the southern mountains' unique beauty, easy accessibility to a majority of the country's population, and the park's location on major tourist routes.

The people who visit their park are interested in it. They want to enjoy visiting the mountains and experience the natural and scenic attractions of the region. In order to do this they must have access to the park and facilities to meet their needs as tourists.

The National Interest

Superseding all other interests is the national interest in the park system. The Park Service is responsible not only for the parks

and their development and use by the general public, but for their preservation so that future generations may enjoy them. This theme has been expressed in the legislation which created the parks and the National Park Service, and in the policies relating to the management of the parks by the service.

The staff of the Great Smoky Mountains National Park has carried out these policies, but under difficult circumstances caused by overcrowding. Campgrounds, picnic areas, museums and visitor centers have been constructed. Trails, park roads, scenic overlooks and trail shelters are maintained. It is agreed by park planners and supporters of the park that further development or additions to the 1,500 camp-sites within the park would be detrimental to the natural and scenic values of the park.[35] It is significant that most recent campground, loop road, and picnic area development has occured in peripheral areas of the park. Park policy does not permit resort-type development within the park and these are therefore provided by private enterprise outside the park.

In view of this policy, the park does not compete with private enterprise, but stimulates it.

Highway Planning Agencies

It is the function of the state highway departments to plan for, locate, construct and/or improve and maintain highways. The

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[35]Statement by Lee Sneedon, Chief Ranger, Great Smoky Mountains National Park, personal interview, April 4, 1968.

standards for alignment, width, sight distance, base and pavement construction and other standards are dictated by the Bureau of Public Roads, a federal bureau under the Department of Transportation. In the process of locating, surveying, and buying highway rights-of-way for proposed highways, the agencies must deal with various groups and interests.

The Bureau of Public Roads is in a position to help appraise national concerns and could control highway building outside of the park boundaries, and thus control access to and circulation around the park. It can only do this properly by cooperation with the other various organizations and interests which are concerned with the situation. Also needed is a means for relating highways in the vicinity of the park to regional objectives as well as to the overall state highway system.

IV. REGION WIDE PUBLIC AND PRIVATE RECREATIONAL RESOURCES

Although the national park is considered the focal point for the development of the tourist industry in the area, future population pressures will necessitate complementary development on nearby public and private lands. The highway system must relate the park to this total recreational demand and facilitate the total development of the region.

With adequate transportation ties to the greater area the region has the potential to develop a major complex of recreational and tourist-oriented facilities. Today the recreation market is primarily on wheels.

It does not concentrate on a resort or one specific place. Tourism today is a mass phenomenon which includes the great bulk of the American public. It is flooding the mountains, lakes, valleys, and beaches of the nation.[36]

The estimated amount spent for vacations by the American public was approximately twenty billion dollars in 1966. The estimated expenditures for all forms of leisure time activities ranges between 35 and 43 billion dollars per year.[37] Recreation is one of the fastest growing industries in the United States and one of the largest. Nearly 2,000,000,000 visits are made to national, state, and local recreation park areas each year, and this number is increasing rapidly. This adds up to a future recreation and tourist potential of great proportions. This statement can be reinforced by several nation-wide trends: (1) America's new participation in leisure-time activities, (2) an increase in per capita income, (3) a shorter work week, and (4) the rapid increase in population. Population projections indicate that there will be 50,000,000 more Americans in 1985.

The projected trends will have a tremendous impact in the study region. The vast complement of existing recreational facilities in the region--The Great Smoky Mountains National Park, the National Forests, the Tennessee Valley lakes, the streams, the pleasant valleys, the scenic highways and trails--will all be crowded beyond capacity.

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[36]Hammer, op. cit., p. 126.

[37]Ibid.

Further, the area is directly accessible to the mass market, two-thirds of the nation's population is within a two-day automobile trip and when the interestate system is completed, most travelers will require only one day's journey.

In light of these facts, the main problem that will face future entrepreneurs in the region will be the problem of how to accommodate the visitors, not how to attract them. There are many public and private recreation facilities within the region and other undeveloped resources which have great potential as tourist attractions.

National Forests

The Cherokee National Forest occupies a large portion of Monroe and Cocke counties. A great majority of Jackson and Graham counties have been placed in the Nantahala National Forest. Approximately half of Haywood County lies within the Pisgah National Forest and Swain County is largely occupied by the national park and the Qualla Indian Reservation.

National forest lands in the region total approximately 400,000 acres. They are rich in scenic, wildlife, watershed, and recreational values and are a valuable source of supply for forest products. The forests, in their present form, were created by President Franklin D. Roosevelt on July 19, 1936.[38]

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[38]U. S. Department of Agriculture, Forest Service Recreation Map, F-3-R8., 1964.

In the early years of the national forests, the policy of the Agriculture Department was to manage these lands for the sole purposes of watershed protection and a sustained yield of forest products. More recently, pressures from the public and the realization of the forests' recreational values have changed this policy to one of management for multiple uses. Some areas of the national forests are now managed primarily for recreation rather than for other purposes. Their potential as recreational resources have only begun to be realized and the possibilities for development are much greater even than the national parks.

One-half of the nation's population is within a 500-mile radius of these forests. Many thousands of people visit them each year and highway improvements and additional recreation developments indicate that attendance will increase rapidly. The forests provide opportunities for families to picnic, camp, hike, swim, fish, hunt and enjoy the outdoors in other ways. Logging and sawmilling provide many jobs that are important to the regional economy. The average water yield per square mile of National Forest areas is estimated to be 1,000,000 gallons per day.[39]

Special consideration is given to areas along main roads, the Appalachian trail, major rivers and lakes, around developed recreational sites, and in the foreground and rear-view at established overlooks. These are called "aesthetic areas," as distinguished from the general forest area.

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[39] Ibid.

> Aesthetic areas are managed so as to maintain or develop pleasant forest surroundings in the areas of heavy public use and travel. The width or size of aesthetic areas depends upon topography, density of vegetation, volume of travel, and other factors. Timber harvesting and other activities are modified to fit the need.[40]

Tennessee Valley Authority Lakes

Among the major attractions within or near the region are the lakes and lakeside land areas under control of the Tennessee Valley Authority. These include Fontana Lake, the highest lake east of the Mississippi River, Norris and Douglas lakes. Other future impoundments such as the one to be created by Tellico Dam, now under construction, offer still more recreational development potential. The proposed impoundments on the upper French Broad should add to the water recreation resources of the area.

Other lakes in the region are Chilhowee, Cheoah, and Calderwood lakes, which were constructed by Alcoa Aluminum Company, and Santeetlah Lake in Nantahala National Forest. All of these lakes are important recreation resources.

State Parks

Although there are no state parks within the region, several are within easy driving distance. In Tennessee, Norris Lake, Big Ridge, and Cove Lake State Parks offer a variety of recreational facilities. In North Carolina, Mount Mitchell State Park and various scenic areas

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[40] Ibid.

along the Blue Ridge Parkway offer tourist accommodations. A new state park is planned for Tennessee at Roan Mountain, which has one of the most spectacular displays of Rhododendron catawbiense in the world. Land is now being purchased by the Conservation Department. Another soon to be created park is Panther Creek State Park on land adjacent to Cherokee Lake.

Private Resort Developments

Private resorts are somewhat concentrated around existing developed attractions such as the park and TVA lakes. The largest resort center is presently Gatlinburg, followed by Fontana Village and Cherokee.

Fontana Village, located near Fontana Lake, offers accommodations for about 1,400 persons, and a variety of recreational opportunities. In 1966, over six million people visited the Fontana Lake Area.[41] In addition, swain county and Bryson City, North Carolina, have large public parks on the lake. Seven privately operated boat docks are located on the lake.

There are 58 developed campgrounds and many private resorts scattered throughout the eight-county region outside the national park.

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[41] TVA Recreation Map, Prepared by TVA Maps and Surveys Branch (Chattanooga, 1966).

CHAPTER VI

CONCLUSIONS AND RECOMMENDATIONS

A consideration of the material presented in this study points to several possible conclusions. Some of the major tenets of the thesis are:

1. Because National Park Service policy requires major accommodations to be outside the park, the highway system must provide and encourage opportunities for commercial development within the region. The peripheral circulation shown in this study can better serve this goal than can additional trans-mountain highways through the interior of the park.
2. The national park must be considered the focal point for development of the tourist industry, for it is the primary magnet which draws the millions of visitors to the region each year.
3. Interior park planning should be related to, but not controlled by exterior forces and interests other than the national interest. The key element in the sound development of the region is a highway system designed to serve the park and the region, and planned to preserve their scenic and natural qualities as a whole.
4. Because of the many interests involved in locating new highways there is a need for some machinery to consider

conflicts of interest and to prepare courses of action. One of the immediate steps which may be taken is the establishment of a forum for discussion and coordination of plans for the region.

5. All highways cannot meet all of the requirements and needs of the various interest groups which have been discussed. The present piece-meal addition to the highway system is not an adequate solution to the regions highway traffic circulation requirements. Therefore, a second step which is recommended is the establishment of a highway classification system, structured so as to meet these requirements. The following section gives some rationale as to how this might be done.

I. ESTABLISHMENT OF A REGIONAL COUNCIL

It is recommended that a regional council be created for the purpose of coordinating all highway location, improvement, and construction within the region. The council composed of representatives from the various involved organizations would serve primarily in a liaison capacity, to coordinate these activities among the various appropriate national, state, and local agencies, bureaus, and departments. This would include, on the national level, the National Park Service, the Public Road Administration, the Tennessee Valley Authority, and the United States Forestry Service. State agency representation would be

chosen from the Tennessee Department of Conservation, the North Carolina Department of Conservation and Development, the Tennessee State Planning Commission, the North Carolina State Planning Task Force, and the state highway departments for North Carolina and Tennessee. Local interests might be represented by the East Tennessee Economic Development Commission and the Western North Carolina Regional Planning Commission.

The council would not be an official agency, and since the national park is the focal point for development in the region, it may be appropriate for the National Park Service to provide a staff for this organization. Minimum staff requirements for the regional council might be satisfied initially by a planner and a secretary.

II. A FUNCTIONAL CLASSIFICATION OF HIGHWAYS WITHIN THE REGION

A functional classification refers to the intended purpose of the highway, and is the principal determining factor in the design of the system. It is the grouping of highways, roads or streets into integrated systems, each ranked by their importance to the general welfare, the motorists and the land-use of the area.[42] This classification is a practical technique for determining the travel corridors that can best serve the traffic in or through a given area, and the predominant purposes of a network or system of highways as they relate

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[42]Marshall F. Reed and P. E. Cranum, Functional Highway Classification in Urban Areas (Washington: Automotive Safety Foundation, July, 1967), p. 5.

to each other. It is also a necessary part of the regional planning process.

> In general the development of integrated systems based on functional classification provides the legislator, planner or engineer with a foundation for:
> (a) establishing administrative highway systems;
> (b) designing minimum design standards for highway systems;
> (c) evaluating both present and future highway needs; and
> (d) apportioning highway fiscal resources.[43]

In developing a functional classification plan, all existing and proposed highways are examined and grouped into functional classes.[44] The classification is based on the concept that most highways serve one or two major purposes--either to provide the motorist with access to abutting land or to allow him movement through an area. This should include a classification of highway which will be designed primarily to permit motorists to enjoy the scenic beauty of the region. Due to the effect of land development on adjacent properties and the interrelations of safety, aesthetics and functions of highways, standards and definitions should be developed.

The major classifications of highways will be dictated to a great extent by the existence of the national park and the emerging traffic pattern. Other classifications may be made which will guide development in a desirable direction. Such a system will allow maximum use of the park attractions by the inevitable millions of persons who will visit

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[43] Ibid.

[44] Ibid.

the area in future years, without destroying the values which make the park valuable as a scenic and natural resource. It will also permit the development and use of appropriate tourist-oriented facilities in the region surrounding the park.

Although the system requires much more study than time permitted by this study, a system is proposed to suggest how such a system might help in the rationalization of the regional highway system. This proposed classification scheme for the major highways within the region is divided into three categories.

Regional Connector Highways

Regional connectors will serve to connect the region and the national park with the major population centers in other states and regions. They will carry a larger volume of traffic than highways of other classifications and will generally be a part of the federal highway system. This category will include the interstate highways, the appalachian corridor highway and U. S. highways 441 and 19. Figure 8 indicates a possible functional classification system for major highways in the region.

Parkways and Scenic Highways

Parkways and scenic highways will be limited access highways. These highways should be located at the periphery or outside the national park in areas which afford outstanding views of the landscape. They may also serve to connect major recreation areas, such as the national forest recreation areas, with the region.

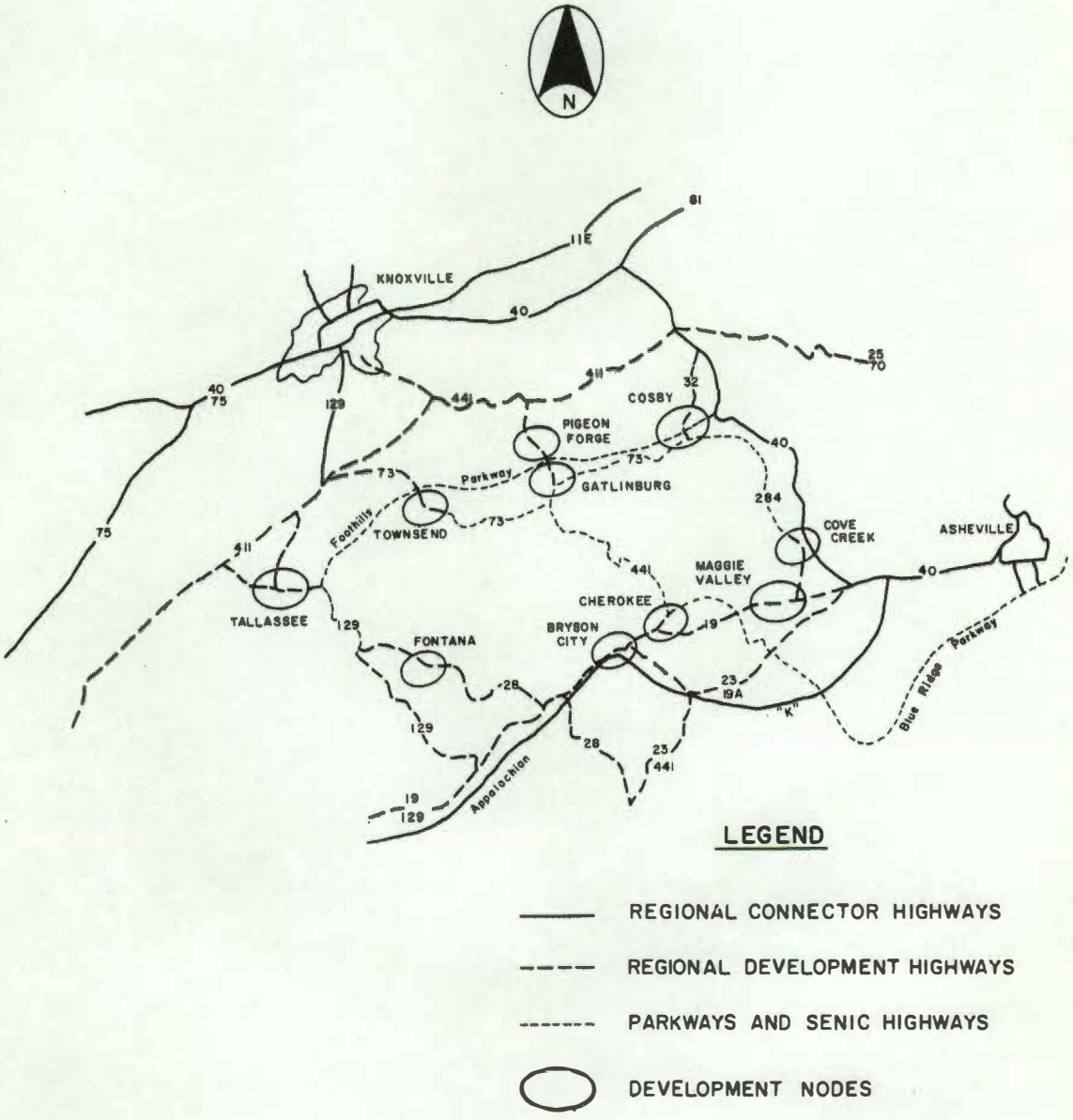

Figure 8. A possible functional highway system for major highways and the location of development nodes in the region.

Within the region, this classification will include the Foothills Parkway, that portion of U. S. 441 from Pigeon Forge to Gatlinburg, and from the park entrance of Gatlinburg to Cherokee, North Carolina, and that portion of Tennessee state highway 73 which lies within the boundaries of the national park. All roads within the park are also scenic roads.

Standards for Parkways and Scenic Highways

Since only a considerable volume of pleasure vehicle traffic can justify establishment of a parkway, location should be directly related to the pleasure traffic requirements of a general area of the necessity for reaching or connecting established or proposed units of a recreation or park system.[45]

A parkway route should be selected that will provide the greatest interest to the traveler in the way of scenic attraction or place of historic and scientific interest. The parkway is characterized by:

(a) adequate protection against undesirable roadside developments;
(b) safe and pleasant alignment and profile;
(c) controlled access;
(d) effective roadside grading and planting;
(f) turnouts for picnicking and relaxation and, on occasion, more elaborate park and recreation developments; and
(g) necessary service structures such as gasoline stations, restaurants, utility buildings, and police stations.[46]

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[45]U. S. Department of the Interior, Parks For America (Washington: U. S. Government Printing Office, 1964), pp. 483-484.

[46]Ibid.

Except in most limited and unusual circumstances, 200 feet is generally considered a minimum width for a parkway and then only in metropolitan sections. The standard for national parkways of 125 acres per mile, or an average width of 1,000 feet, is extreme for most state parkways because of their frequent location in urbanizing areas.

Regional Development Highways

Regional development highways will serve both to carry traffic from the regional connectors to urbanizing areas, recreational centers and development nodes. Commercial development will be allowed only along this classification of highway and state laws and local ordinances should control access to and development along these highways.

Development Nodes

With the completion of this highway system, a desirable traffic circulation and regional development pattern will be possible. This pattern of access to the park and the region will precipitate development at certain predictable points within the region. Although scattered development will be encouraged at other points, the major developments should occur in those areas which have already developed a base for certain urban-type services. These areas may be called development nodes. These nodes, as indicated on Figure 8 on page 66, are Gatlinburg, Cosby, the Maggie Valley-Jonathan Creek Area, Cherokee, Sylva, Bryson City, Fontana, Tallassee, and Townsend.

This study indicates that this pattern of development will maximize the resources of the region and preserve those scenic and natural values which draw tourists to the region.

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